

TAB J

PART 4

OCT-02-2002 15:04

HAIN LOESER + PARKS

3308647986 P.13

Practitioner's Docket No. 6014-2-CON

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Keith Leighton

Group No.: 1733

Application No.: 09368,846

Examiner: J. Aftergut

Filed: August 5, 1999

Date: October 2, 2002

For: Hot Lamination Process for the Manufacture of a Combination
Contact/Contactless Smart Card and Product Resulting Therefrom

Assistant Commissioner for Patents
Washington D.C. 20231

**TERMINAL DISCLAIMER TO OBVIATE
A DOUBLE PATENTING REJECTION (37 C.F.R. Section 1.321(c))**

Identification of Person(s) Making This Disclaimer

I, Michael H. Minns, represent that I am the attorney of record.

EXTENT OF DISCLAIMANT'S INTEREST

The extent of the interest in this invention that the disclaimant owns is in the whole of this invention.

DISCLAIMER

(Obviousness-Type Double Patenting Rejection Over A Prior Patent)

Petitioner hereby disclaims, except as provided below, the terminal part of any patent granted on the instant application, which would extend beyond the expiration dates of Patent Nos. 5,817,207, and 6,036,099 as presently shortened by any terminal disclaimer(s). Petitioner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the above-listed patents are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors, or assigns.

In making the above disclaimer, 1) disclaimant is not admitting the propriety of the merits of the double patenting rejections; and 2) disclaimant does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. Sections 154 to 156 and

OCT-02-2002 15:04

Hahn Loeser + Parks

3308647986 P.14

Docket No. 6014-2-CON
Serial No. 09/368,846

173 of the patents forming the basis of the double patenting rejection, namely, Patent Nos. 5,817,207 and 6,036,099, as presently shortened by any terminal disclaimer, in the event that either patent later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. Section 1.321, has all claims cancelled by a reexamination certificate, is reissued, or is in any manner terminated prior to expiration of its full statutory term as presently shortened by any terminal disclaimer, except for the separation of legal title stated above.

DISCLAIMER FEE (37 C.F.R. Section 1.20(d))

Small entity--fee \$55.00.

Small entity statement already filed in patent application 09/918,582 on August 18, 1997.

FEE PAYMENT

The \$55.00 fee was enclosed with the response filed March 5, 2002.

Charge Account No. 15-0450 for any fee deficiency.

Date: October 2, 2002

Reg. No.: 31,985
Tel. No.: 330-864-5550
Customer No.: 021324



Signature of Practitioner

Michael H. Minns
Hahn, Loeser & Parks, LLP
1225 West Market Street
Akron, OH 44313-7188

Interview Summary	Application No.	Applicant(s)	
	09/368,846	LEIGHTON, KEITH R.	
	Examiner	Art Unit	
	Jeff H. Aftergut	1733	

All participants (applicant, applicant's representative, PTO personnel):

(1) Jeff H. Aftergut (3) _____

(2) Michael Minns (4) _____

Date of Interview: 09 October 2002.

Type: a) ☒ Telephonic b) ☐ Video Conference
c) ☐ Personal [copy given to: 1) ☐ applicant 2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☒ No.
If Yes, brief description: _____.

Claim(s) discussed: 12 and 13.

Identification of prior art discussed: none.

Agreement with respect to the claims f) ☒ was reached. g) ☐ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: discussed a need to correct the dependency of claims 12 and 13 (which depended upon canceled claim 11) Also discussed correcting the claim to provide proper antecedent basis for the claim in relation to the coating provided on the core.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

i) ☒ It is not necessary for applicant to provide a separate record of the substance of the interview (if box is checked).

Unless the paragraph above has been checked, THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

Examiner's signature, if required _____

Summary of Record of Interview Requirement

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent and Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiner's Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case unless both applicant and examiner agree that the examiner will record same. Where the examiner agrees to record the substance of the interview, or when it is adequately recorded on the Form or in an attachment to the Form, the examiner should check the appropriate box at the bottom of the Form which informs the applicant that the submission of a separate record of the substance of the interview as a supplement to the Form is not required.

It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials. J125

Notice of Allowability	Application No.	Applicant(s)	
	09/368,846	LEIGHTON, KEITH R.	
	Examiner	Art Unit	
	Jeff H. Aftergut	1733	

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address–

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment after final dated 10-2-02.
2. ☒ The allowed claim(s) is/are 1-5, 7-10, 12-17, 23-29 and 31.
3. ☒ The drawings filed on 05 August 1999 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____

5. ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 - (a) ☐ The translation of the foreign language provisional application has been received.
6. ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE**

7. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
8. ☐ CORRECTED DRAWINGS must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No. _____.
 - (b) ☐ including changes required by the proposed drawing correction filed _____, which has been approved by the Examiner.
 - (c) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No. _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the top margin (not the back) of each sheet. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

9. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1 <input type="checkbox"/> Notice of References Cited (PTO-892) 3 <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 5 <input type="checkbox"/> Information Disclosure Statements (PTO-1449), Paper No. _____ 7 <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material	2 <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) 4 <input type="checkbox"/> Interview Summary (PTO-413), Paper No. _____ 6 <input checked="" type="checkbox"/> Examiner's Amendment/Comment 8 <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance 9 <input type="checkbox"/> Other
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Application/Control Number: 09/368,846
Art Unit: 1733

17/C
JHA
10/1/02
Page 2

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Michael Minns on 10-9-02.

The application has been amended as follows:

In the claims:

In claim 12, line 2, "1" has been changed to --1--.

In claim 12, line 2, "said" has been changed to --a--.

In claim 12, line 2, after the word "out" the language --on at least one surface of said core-- has been added.

In claim 13, line 2, "11" has been changed to --1--.

In claim 13, line 2, "said" has been changed to --a--.

In claim 13, line 2, after the word "out" the language --on at least one surface of said core-- has been added.

2. The following is an examiner's statement of reasons for allowance: None of the prior art of record taught or suggested that one skilled in the art at the time the invention was made to apply a second pressure upon the assembly during cooling wherein the second pressure was at least 10% greater than the first pressure applied during assembly and heating.

Application/Control Number: 09/368,846
Art Unit: 1733


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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff H. Aftergut whose telephone number is 703-308-2069. The examiner can normally be reached on Monday-Friday 6:30-3:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael W. Ball can be reached on 703-308-2058. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.


Jeff H. Aftergut
Primary Examiner
Art Unit 1733

JHA
October 9, 2002



UNITED STATES PATENT AND TRADEMARK OFFICE

 UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER OF PATENTS AND TRADEMARKS
 Washington, D.C. 20531
 www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

 21324 7590 10/10/2002
 HAHN LOESER & PARKS, LLP
 TWIN OAKS ESTATE
 1225 W. MARKET STREET
 AKRON, OH 44313

EXAMINER

AFTERGUT, JEFF H

ART UNIT

CLASS-SUBCLASS

1733

156-153000

DATE MAILED: 10/10/2002

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/368,846	08/05/1999	KEITH R. LEIGHTON	6014-2-CON	6007

TITLE OF INVENTION: HOT LAMINATION PROCESS FOR THE MANUFACTURE OF A COMBINATION CONTACT/CONTACTLESS SMART CARD

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$640	\$0	\$640	01/10/2003

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS** FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status is changed, pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above and notify the United States Patent and Trademark Office of the change in status, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check the box below and enclose the PUBLICATION FEE and 1/2 the ISSUE FEE shown above.

☐ Applicant claims SMALL ENTITY status.
 See 37 CFR 1.27.

II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Box ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** Box ISSUE FEE
Commissioner for Patents
Washington, D.C. 20231
Fax (703)746-4000

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 4 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Lightly mark-up with any corrections or use Block 1)
 21324 7590 10/10/2002

HAHN LOESER & PARKS, LLP
TWIN OAKS ESTATE
1225 W. MARKET STREET
AKRON, OH 44313

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
 I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Box Issue Fee address above, or being facsimile transmitted to the USPTO, on the date indicated below.

(Depositor's name)
 (Signature)
 (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/368,846	08/05/1999	KEITH R. LEIGHTON	6014-2-CON	6007

TITLE OF INVENTION: HOT LAMINATION PROCESS FOR THE MANUFACTURE OF A COMBINATION CONTACT/CONTACTLESS SMART CARD

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$640	\$0	\$640	01/10/2003

EXAMINER	ART UNIT	CLASS-SUBCLASS
AFTERGUT, JEFF H	1733	156-153000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
 2 _____
 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the USPTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY AND STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) ☐ individual ☐ corporation or other private group entity ☐ government

4a. The following fee(s) are enclosed:

☐ Issue Fee

☐ Publication Fee

☐ Advance Order - # of Copies _____

4b. Payment of Fee(s):

☐ A check in the amount of the fee(s) is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Commissioner is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

Commissioner for Patents is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.

(Authorized Signature)

(Date)

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Washington, DC 20231.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMIT THIS FORM WITH FEE(S)

J130



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER OF PATENTS AND TRADEMARKS
 Washington, D.C. 20231
 www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/368,846	08/05/1999	KEITH R. LEIGHTON	6014-2-CON	6007
21324	7590	10/10/2002	EXAMINER	
AFTERGUT, JEFF H				
HAHN LOESER & PARKS, LLP TWIN OAKS ESTATE 1225 W. MARKET STREET AKRON, OH 44313 UNITED STATES			ART UNIT	PAPER NUMBER
			1733	
DATE MAILED: 10/10/2002				

Determination of Patent Term Extension under 35 U.S.C. 154 (b)
 (application filed after June 7, 1995 but prior to May 29, 2000)

The patent term extension is 0 days. Any patent to issue from the above identified application will include an indication of the 0 day extension on the front page.

If a continued prosecution application (CPA) was filed in the above-identified application, the filing date that determines patent term extension is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) system. (<http://pair.uspto.gov>)



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/368,846	08/05/1999	KEITH R. LEIGHTON	6014-2-CON	6007
21324	7590	10/10/2002	EXAMINER	
HAHN LOESER & PARKS, LLP TWIN OAKS ESTATE 1225 W. MARKET STREET AKRON, OH 44313 UNITED STATES			AFTERGUT, JEFF H	
			ART UNIT	PAPER NUMBER
			1733	
DATE MAILED: 10/10/2002				

Notice of Possible Fee Increase on October 1, 2002

If a reply to a "Notice of Allowance and Fee(s) Due" is filed in the Office on or after October 1, 2002, then the amount due may be higher than that set forth in the "Notice of Allowance and Fee(s) Due" since there may be an increase in fees effective on October 1, 2002. See Revision of Patent and Trademark Fees for Fiscal Year 2003: Notice of Proposed Rulemaking, 67 Fed. Reg. 30634, 30636 (May 7, 2002). Although a change to the amount of the publication fee is not currently proposed for October 2002, if the issue fee or publication fee is to be paid on or after October 1, 2002, applicant should check the USPTO web site for the current fees before submitting the payment. The USPTO Internet address for the fee schedule is: <http://www.uspto.gov/main/howtofees.htm>.

If the issue fee paid is the amount shown on the "Notice of Allowance and Fee(s) Due," but not the correct amount in view of any fee increase, a "Notice to Pay Balance of Issue Fee" will be mailed to applicant. In order to avoid processing delays associated with mailing of a "Notice to Pay Balance of Issue Fee," if the response to the Notice of Allowance and Fee(s) due form is to be filed on or after October 1, 2002 (or mailed with a certificate of mailing on or after October 1, 2002), the issue fee paid should be the fee that is required at the time the fee is paid. If the issue fee was previously paid, and the response to the "Notice of Allowance and Fee(s) Due" includes a request to apply a previously-paid issue fee to the issue fee now due, then the difference between the issue fee amount at the time the response is filed and the previously paid issue fee should be paid. See Manual of Patent Examining Procedure, Section 1308.01 (Eighth Edition, August 2001).

Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail Box ISSUE FEE**
Commissioner for Patents
Washington, D.C. 20231
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Mark A. Watkins (Depositor's name)
Mark A. Watkins (Signature)
12/12/02 (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/208,846	08/03/1999	KEITH E. LEIGHTON	6014-3-CON	6067

TITLE OF INVENTION: HOT LAMINATION PROCESS FOR THE MANUFACTURE OF A COMBINATION CONTACT/CONTACTLESS SMART CARD

APPL. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
unpublished	YES	\$640	\$0	\$640	01/10/2003

EXAMINER	ART UNIT	CLASS-SUBCLASS
APTEGUT, RFP H	1723	156-153000

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APPROVED	O.G. FIG. 5	
BY	CLASS	SUBCLASS
DRAFTSMAN	156	153

6514367

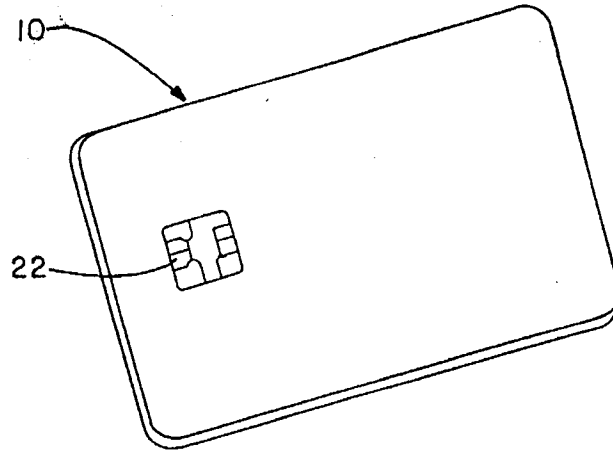


FIG. - 1

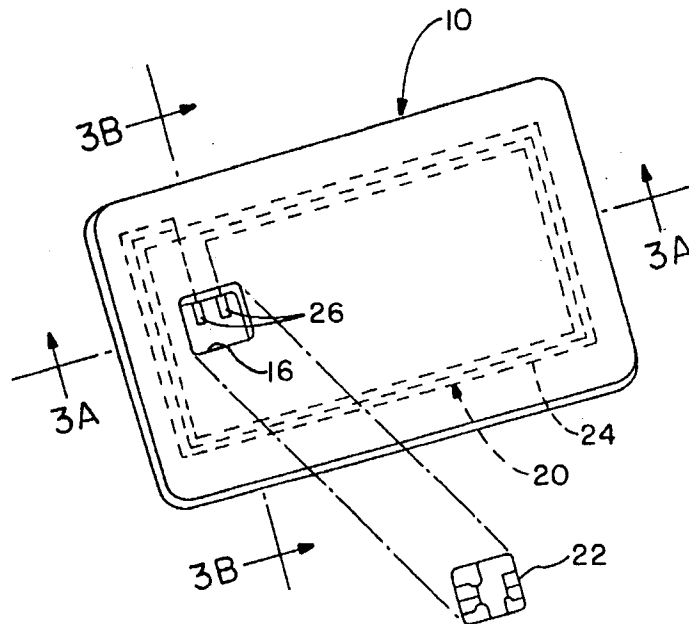


FIG. - 2

APPROVED	O.G. FIG. 5	
BY	CLASS	SUBCLASS
DRAFTSMAN	156	153

FIG.-2A

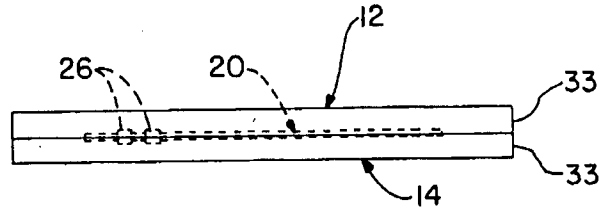


FIG.-3A

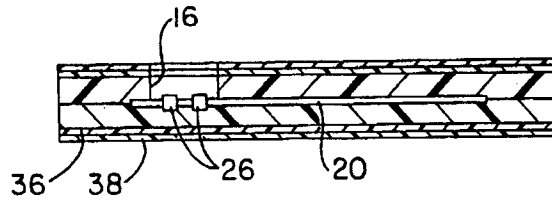


FIG.-3B

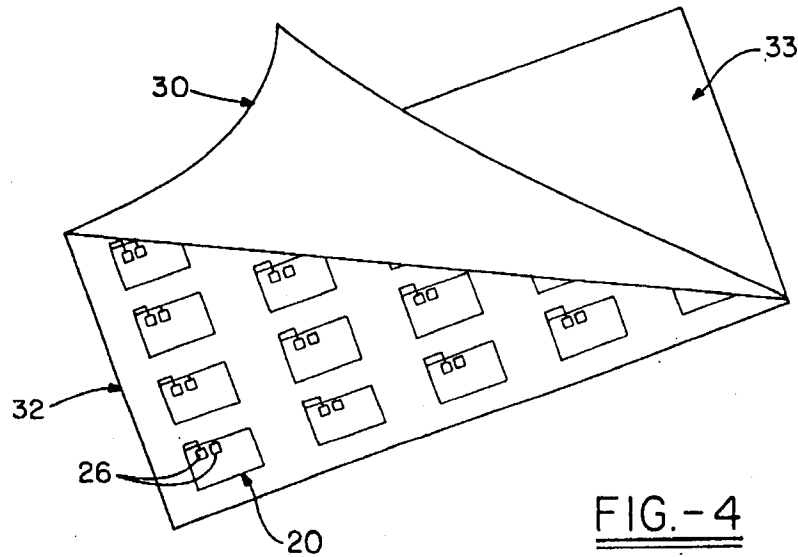
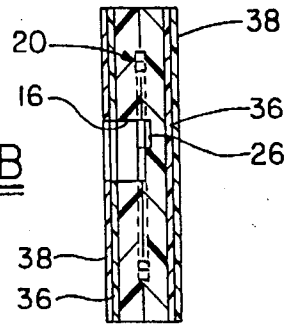
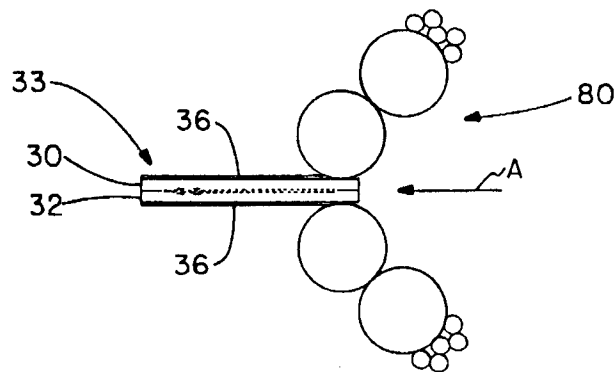
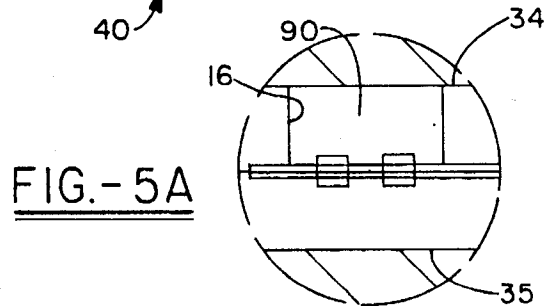
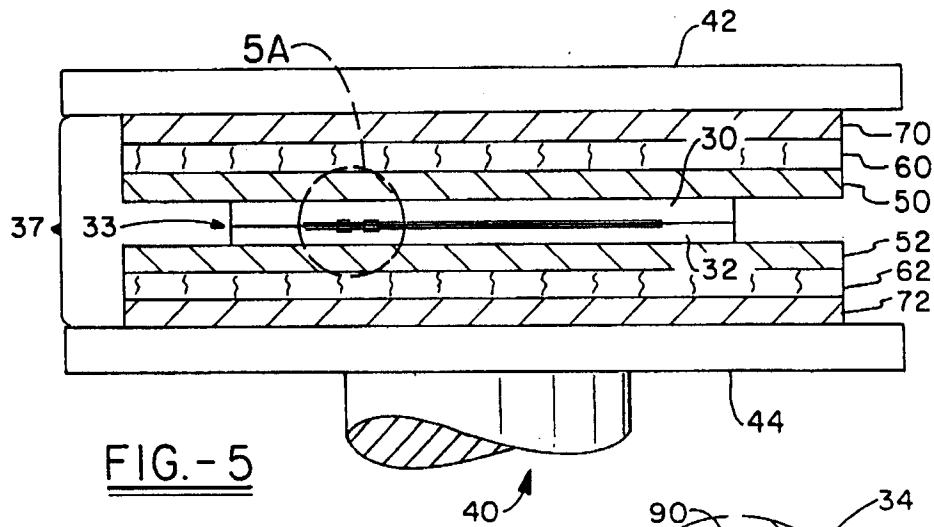


FIG.-4

APPROVED	O.G. FIG. 5	
BY	CLASS	SUBCLASS
DRAFTSMAN	156	153



APPROVED	O.G. FIG. 5	
BY	CLASS	SUBCLASS
DRAFTSMAN	156	153

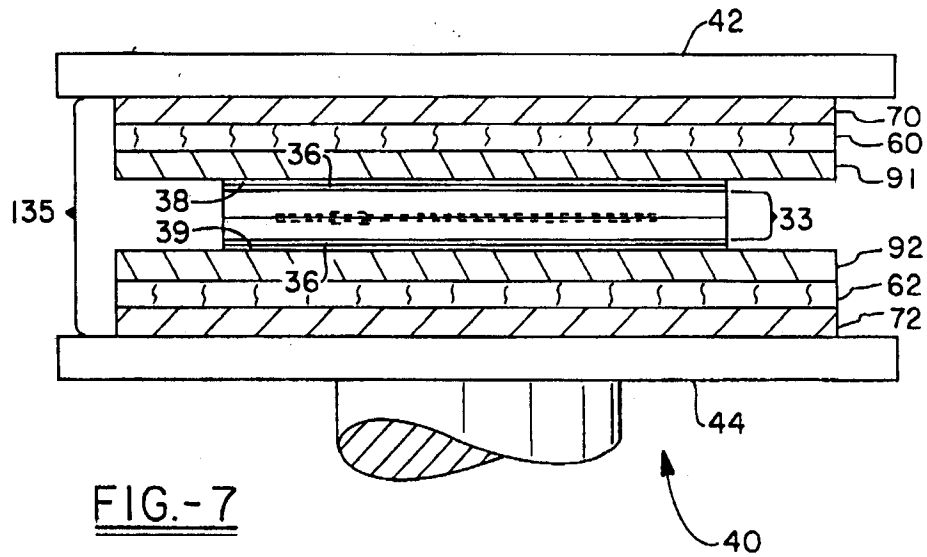
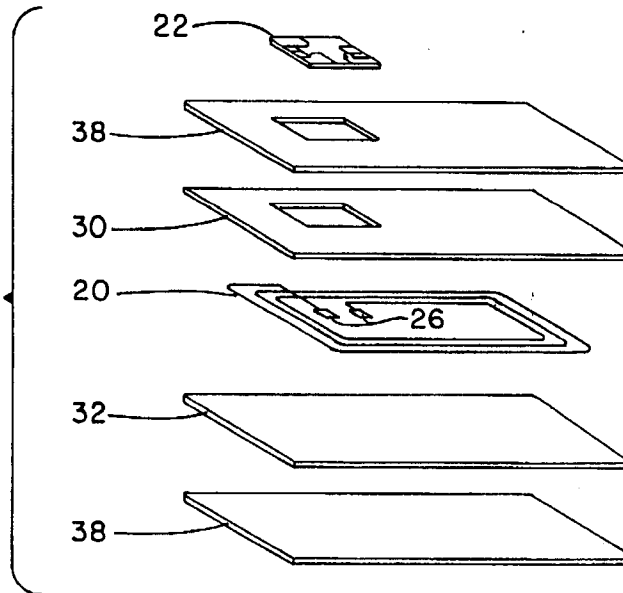


FIG. -8



PATENT APPLICATION FEE DETERMINATION RECORD Effective November 10, 1998				Application or Docket Number <div style="font-size: 1.2em; margin-top: 5px;">09/368846</div>	
CLAIMS AS FILED - PART I					
(Column 1)		(Column 2)			
FOR	NUMBER FILED	NUMBER EXTRA			
BASIC FEE					
TOTAL CLAIMS	29 minus 20 = *	4			
INDEPENDENT CLAIMS	2 minus 3 = *	1			
MULTIPLE DEPENDENT CLAIM PRESENT					
* If the difference in column 1 is less than zero, enter "0" in column 2					
CLAIMS AS AMENDED - PART II					
(Column 1)		(Column 2)		(Column 3)	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		
	Total	* 29	Minus	** 29	= -
	Independent	* 3	Minus	*** 3	= -
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				
AMENDMENT B					
(Column 1)		(Column 2)		(Column 3)	
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		
	Total	*	Minus	**	=
	Independent	*	Minus	***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				
AMENDMENT C					
(Column 1)		(Column 2)		(Column 3)	
AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		
	Total	*	Minus	**	=
	Independent	*	Minus	***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20." *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3." The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.					

SMALL ENTITY TYPE <input type="checkbox"/>		OR OTHER THAN SMALL ENTITY	
RATE	FEE	RATE	FEE
	380.00	OR	760.00
X\$ 9=	36	OR	X\$18=
X39=		OR	X78=
+130=		OR	+260=
TOTAL	476	OR	TOTAL

SMALL ENTITY TYPE <input type="checkbox"/>		OR OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE	RATE	ADDITIONAL FEE
X\$ 9=		OR	X\$18=
X39=		OR	X78=
+130=		OR	+260=
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE

United States Patent [19]**Sitzberger**[11] **3,994,225**[45] **Nov. 30, 1976**

[54] **METHOD OF PRODUCING PERSONALIZED BADGES AND THE LIKE** 3,191,154 6/1965 Sallach et al. 340/172.5
 3,402,488 9/1968 Leavitt 40/2.2
 3,619,573 11/1971 Philip 355/40
 [75] Inventor: **Francis D. Sitzberger**, Downers R27,809 11/1973 Drillick 101/18
 Grove, Ill.

[73] Assignee: **Adcraft Mfg. Co.**, Chicago, Ill.[22] Filed: **Nov. 26, 1975**[21] Appl. No.: **635,284****Related U.S. Application Data**

[63] Continuation of Ser. No. 446,238, Feb. 27, 1974, abandoned.

[52] **U.S. Cl.** **101/426; 40/2.2; 101/369; 101/90; 346/33 R; 346/153; 96/27**[51] **Int. Cl.** **B41M 3/00; B41L 45/12**[58] **Field of Search** **101/426, 369**[56] **References Cited****UNITED STATES PATENTS**

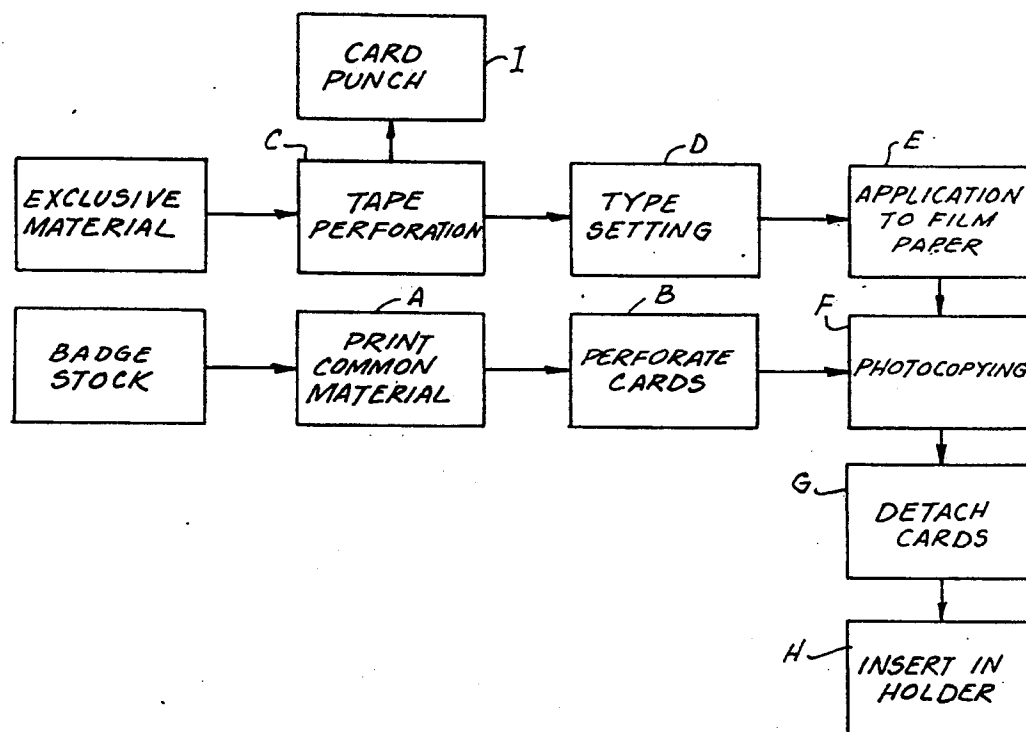
3,152,901 10/1964 Johnson 96/43

Primary Examiner—Clyde I. Coughenour*Attorney, Agent, or Firm*—Hill, Gross, Simpson, Van Santen, Steadman, Chiara & Simpson

[57]

ABSTRACT

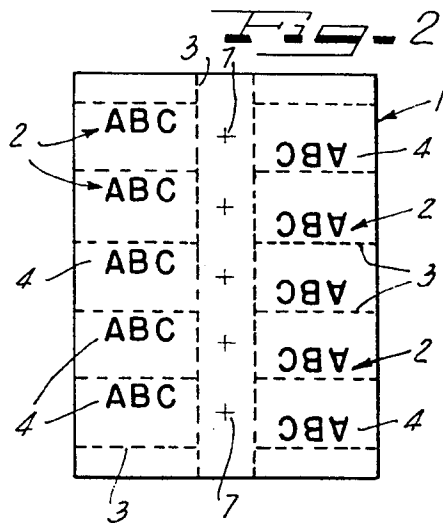
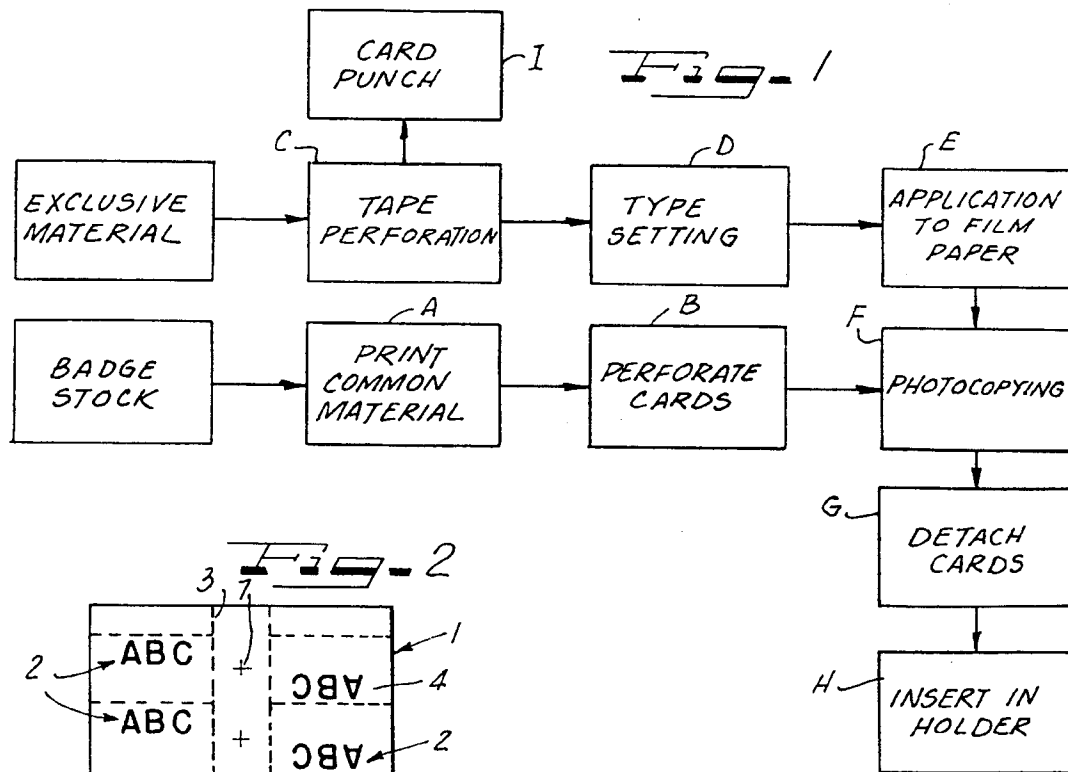
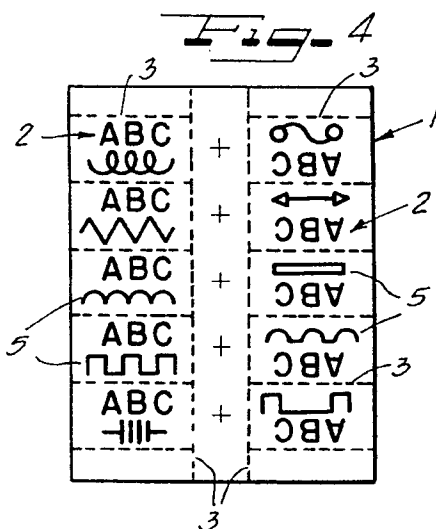
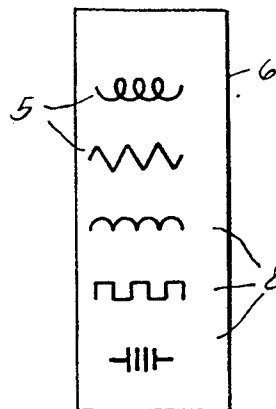
A method of fabricating a plurality of individual badges such as name badges and the like, each bearing indicial material common to all of such plurality of badges, and each bearing specific indicial material exclusive to the respective individual badges, in which the badge blanks are initially imprinted with the common indicial material and subsequently provided with the respective exclusive indicial material by an electrostatic or photocopying process.

3 Claims, 4 Drawing Figures

U.S. Patent

Nov. 30, 1976

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**Fig. 3**

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METHOD OF PRODUCING PERSONALIZED BADGES AND THE LIKE

This is a continuation of application Ser. No. 446,238, filed Feb. 27, 1974, now abandoned.

BACKGROUND OF THE INVENTION

The invention is directed to the production of personalized badges, i.e., badges which contain indicial material common to all of the badges and in addition individual or specific indicial material which is different for each badge, i.e., normally is exclusive to a single badge.

Examples of this type of badge are those for use at conventions, shows, etc. wherein each delegate or member is provided with a badge containing, in addition to material identifying both the show or convention, other personal identification such as the name of the badge holder, the organization with which he is associated, location, address, etc. It will be appreciated that with such type of badge the inclusion of specific material, exclusive to each respective badge, presents problems in the printing thereof and where a large number of badges are involved, necessitates a considerable amount of time in effecting type changes, etc. if the badges are to be printed, likewise increasing the cost thereof.

The present invention is directed to a method of producing such badges in a simple, inexpensive and yet highly efficient manner, with the individual badges having an appearance equivalent to that achieved by the usual printing operation.

BRIEF SUMMARY OF THE INVENTION

The desired results are achieved with the present invention by a method in which a suitable sheet of badge stock is imprinted in the usual manner with material which is common to all badges, for example, name of the organization involved, class identification, i.e., guest, member, delegate, etc. which is applicable to all or a large number of the badges to be produced. Likewise, the back of such badge blank may be suitably imprinted with any desired informative material or the like, as for example location, dates, time, etc.

A master copy containing the individual specific indicial material to appear exclusively on respective badges is produced, with the specific material oriented in identical manner to the orientation and disposition of the respective individual badges imprinted on the sheet of badge stock. Such individual material may then be applied to the sheet of badge blanks by a photocopying operation in which such master sheet is utilized as the original to be duplicated and the sheet of badge blanks comprises the stock on which such duplication is to be effected. By suitable orientation of the common material appearing on the sheet of badge stock, duplication may be effected with proper orientation and registration with the common material, initially applied to the sheet, to complete the material to appear thereon. Following such operation the respective badges may be individually detached from the sheet and if desired placed in suitable holders.

To facilitate an ultimate separation of the respective badges the sheet of badge stock may be perforated, at a convenient time, along the marginal portions of each individual badge, enabling, if desired, the badges to be handled and transported in convenient sheet form and

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subsequently separated into the individual badges, for example, at time of use.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings wherein like reference characters indicate like or corresponding parts:-

FIG. 1 is a flow diagram, in block form, illustrating sequential steps in the production of badges in accordance with the with the present invention;

FIG. 2 illustrates a portion of a sheet of badge stock with the badges thereon having a common imprint;

FIG. 3 illustrates a portion of a master copy sheet containing material exclusive to individual badges; and FIG. 4 is a portion of a sheet of badges following application of such exclusive material thereto.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. 1, a sheet of stock, such as the sheet 1 of FIG. 2, from which a plurality of badges 2 are to be formed, is initially imprinted at a station A and in the same operation or at a subsequent station B may be perforated, for example, as illustrated in FIG. 2, by the broken lines 3. The material imprinted in such operation may comprise that which is common to all of the badges being produced, or to a number thereof, sufficiently large to make it advantageous to imprint the same as a group, for example the material 4 of FIG. 2. Any suitable printing mechanism may be employed for such purpose and likewise if the blanks are to be perforated, any suitable perforating equipment, either in combination with the printing mechanism or as an additional piece of equipment may be employed to achieve the desired results.

The material which each badge, for example material 5 illustrated in FIG. 3, is to carry exclusively is supplied to a suitable tape perforator C which provides a perforated tape containing the desired information and which may be supplied to a type setting mechanism D of any suitable type with tape control for effecting a type-setting representing such exclusive material. It will be appreciated that there are numerous tape perforating equipment available, as well as various types of type-setting machinery, for example, those known under the trademarks "COMPUGRAPHICS 4961" and "Varityper 748" are typical examples of equipment which may be employed for these operations. Following the type setting operation, making sure that the material exclusive to each individual badge blank is accurately oriented both vertically and horizontally with respect to the orientation of the individual badges and material thereon disposed on the sheet of badge stock, the set type is then employed, at Station F of FIG. 1, to form a master copy 6, schematically illustrated in FIG. 3, containing such exclusive material. Suitable paper, for example film paper, may be employed as the media upon which the exclusive material is received, and any suitable type of film paper or the like may be employed. One which has proven to be very efficient is that designated as "Spectamatic" film paper manufactured by Eastman Kodak Company. The master copy so formed is then suitably employed as original copy material on a duplicating machine i.e., a photocopying machine (Station F of FIG. 1) with the sheet of badge stock containing the respective badge blanks being utilized as the supply stock of the photocopying equipment.

One machine found to be particularly suitable for such copy work is that manufactured by Xerox Corporation, employing an electrostatic process.

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In effecting the photocopying, the film paper carrying the exclusive material will have such material exclusive to the individual badges spaced identically with the badge spacing on the sheet of badge stock so that by proper orientation of the film paper in the copy window of the machine, it may be readily accurately aligned for proper reproduction. Preferably, the film paper, as used in the copying machine is in the form of a strip, of a width to contain a single column of the respective inserts to appear on each badge, with such film paper being cut in lengths to accommodate the same number of badges as appears in a column on the sheet of badge stock and if desired the direction of the columns may be reversed as illustrated in FIGS. 2 and 4. Registration may be facilitated by suitable cooperable registration marks 7 on the imprinted badge stock and the marks 8 on the respective film strips.

In most cases the size of the badge 2 will be such that two columns of badges, each column containing four or five badge blanks, may be obtained from a single sheet of badge stock which, of necessity, must be limited in size to that capable of being processed by a particular photocopy machine involved, for example $8\frac{1}{2} \times 14$ inches.

While the limitations of the copying machine employed, of necessity imposes maximum dimensions of the sheet of badge stock employed, such a sheet is of adequate size to enable the production of from 8 to 10 badges per sheet of the type that will normally be involved. Likewise, the limitations on such machines as to thickness of stock which may be run through the machine imposes a further maximum limit with respect to the thickness of such sheet stock. It is believed that in most cases the stock may run from 0.0095 inch to 0.005 inch which will normally be of adequate thickness for the desired purposes.

The finished badge card 2 may then be detached, as indicated at G in FIG. 1, and subsequently inserted in a suitable plastic or other holder with adhesive or thin type fastening means, etc., as indicated at H in FIG. 1.

It will also be appreciated that by perforating the card prior to entering into the copying machine provides additional flexibility to the card stock enabling it to more readily conform to the circumference of the drum structures employed with such types of copying machines.

The paper tape following its usage in the method above described can then be readily employed for the production of computer cards and the like, as indicated at I in FIG. 1, whereby such cards contain the information originally on the tape, and following transfer to the cards such information is thereafter available for use in computers, etc. for a wide variety of purposes, for example, making labels, rosters or any other information that might be pertinent.

It will be appreciated from the above that I have provided a novel method in which a plurality of badges may be produced, each of which carries its own distinctive exclusive material in addition to material common

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to all of the badges, and eliminates difficulties associated with performing customary printing operations with respect to the exclusive material, thereby further eliminating considerable labor as well as effecting a considerable savings in time. The application of the exclusive material by means of a photocopying machine provides not only a simple method but one which may be readily performed, with the registration of the exclusive material with respect to the common material being readily performed without necessitating makeup changes, etc. that might otherwise be involved where a strict imprinting operation is employed.

Having thus described my invention it will be obvious that although various minor modifications might be suggested by those versed in the art, it should be understood that I wish to embody within the scope of the patent granted hereon all such modifications as reasonably, and properly come within the scope of my contribution to the art.

I claim as my invention:

1. A method of fabricating a plurality of individual badges such as name badges and the like, each bearing printed indicial material common to all of such plurality of badges, and each bearing specific printed indicial material exclusive to the respective individual badges, comprising the steps of forming a plurality of badge blanks by imprinting a sheet of badge stock, from which a plurality of badges are to be formed, with the indicial material common to all of such badges being disposed in predetermined orientation and spacing, forming a perforated tape strip containing the specific printed indicial material exclusive to the plurality of badges of such sheet, controlling the operation of a typesetting machine with said tape to effect a typesetting of such exclusive printed indicial material, while effecting an orientation and spacing of such material in correspondence to the orientation and spacing of the common material on said sheet of badge stock, reproducing from said type set material a master copy on a sheet of material, with the respective specific indicial material thereon operatively aligned both vertically and horizontally with the cooperable common indicial material of respective badge blanks on said sheet of badge stock, and electrostatically reproducing the indicial material on said master copy on said badge blanks, to provide a plurality of individualized badges which may be subsequently detached from said sheet for insertion in individual carrier means therefor.

2. A method according to claim 1 comprising in further combination the step of perforating all edges of the badges necessary to sever each badge from the sheet of badge stock.

3. A method according to claim 1 comprising in further combination the step of providing registration marks on both the imprinted sheet of badge stock and on the master copy for effecting accurate registration of the exclusive material on said sheet.

* * * * *

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United States Patent [19]**Haghiri-Tehrani et al.**[11] **4,450,024**[45] **May 22, 1984**[54] **IDENTIFICATION CARD WITH AN IC-MODULE AND METHOD FOR PRODUCING IT**[75] **Inventors:** **Yahya Haghiri-Tehrani; Joachim Hoppe**, both of Munich, Fed. Rep. of Germany[73] **Assignee:** **GAO Gesellschaft für Automation und Organisation mbH**, Munich, Fed. Rep. of Germany[21] **Appl. No.:** **288,496**[22] **Filed:** **Jul. 30, 1981**[30] **Foreign Application Priority Data**

Aug. 7, 1980 [DE] Fed. Rep. of Germany 3029939

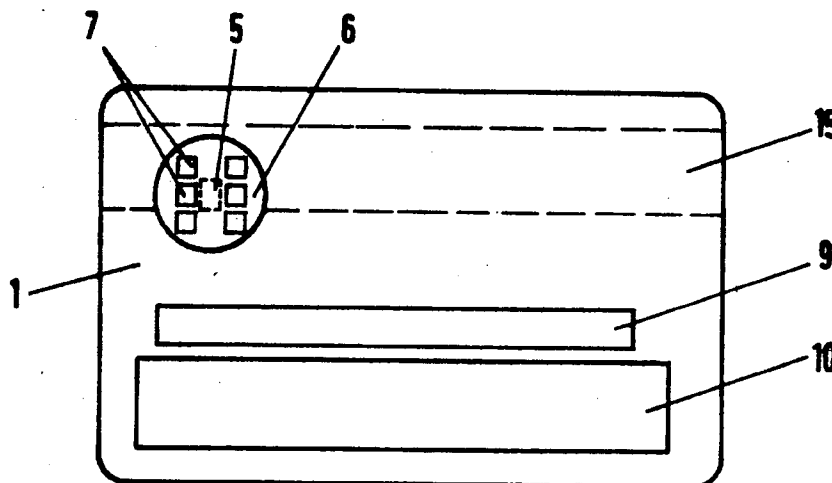
[51] **Int. Cl.³** **B60J 1/00**[52] **U.S. Cl.** **156/108; 156/182; 156/293; 156/295; 156/306.6; 156/309.6; 156/309.9; 156/322; 156/324.4; 264/272.17; 264/279.1; 428/901; 428/916; 283/75**[58] **Field of Search** **156/182, 322, 295, 331.7, 156/108, 306.6, 293, 309.6, 309.9, 324.4; 264/272.17, 279.1; 428/67, 901, 76, 916, 138; 235/488; 29/831, 841, 577 C; 40/2.2**[56] **References Cited****U.S. PATENT DOCUMENTS**

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3,411,981	11/1968	Thomas	156/309.9
3,417,497	12/1968	Hannon	40/2.2
3,811,977	5/1974	Kramer	156/108
4,216,577	8/1980	Badet et al.	264/272.17

Primary Examiner—John J. Gallagher*Attorney, Agent, or Firm*—Andrus, Scales, Starke & Sawall[57] **ABSTRACT**

An identification card equipped with an integrated circuit, in which the circuit along with its connection leads is arranged on a carrier element which is embeddedly enclosed by the card on all sides by use of the hot lamination technique. In order to protect the sensitive arrangement, the carrier element is subjected to the full laminating pressure only when one or more layers in the card construction have softened.

This is achieved, for example, by providing buffer zones in the card laminate at least in the area of the arrangement in the form of cavities or layers that are easy to deform elastically. The buffer zones protect the arrangement from local pressure peaks in the initial phase of the laminating process. It is also possible to control the laminating pressure as a function of the temperature or the degree of softening of the card layers.

12 Claims, 9 Drawing Figures

U.S. Patent May 22, 1984

Sheet 1 of 2

4,450,024

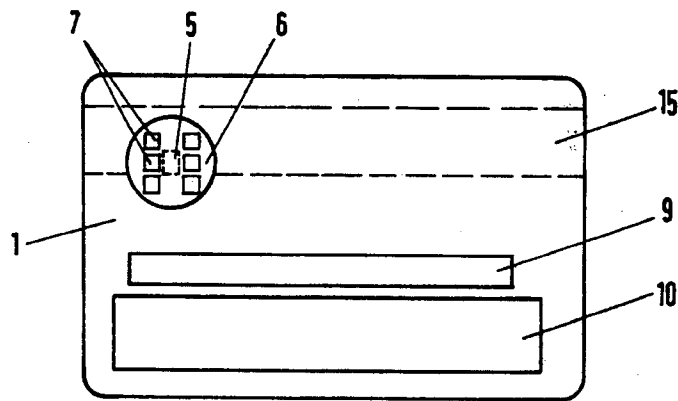


FIG. 1

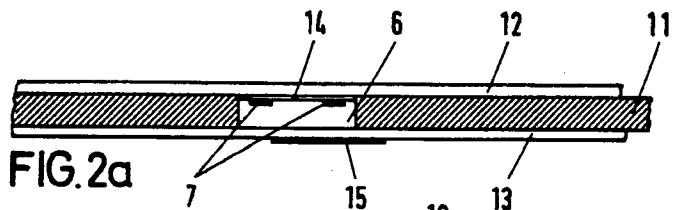


FIG. 2a

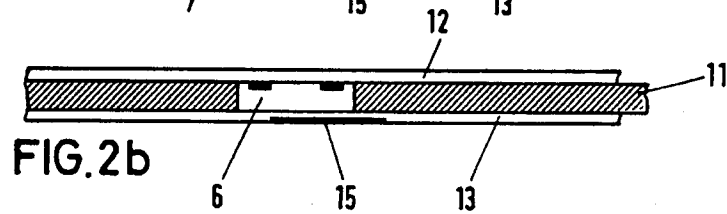


FIG. 2b

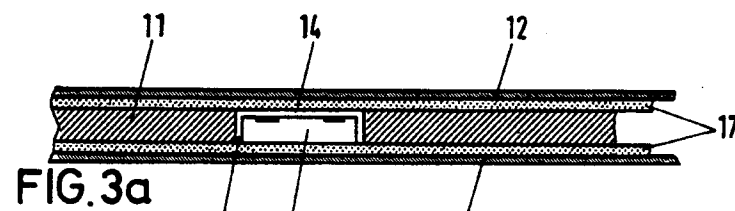


FIG. 3a

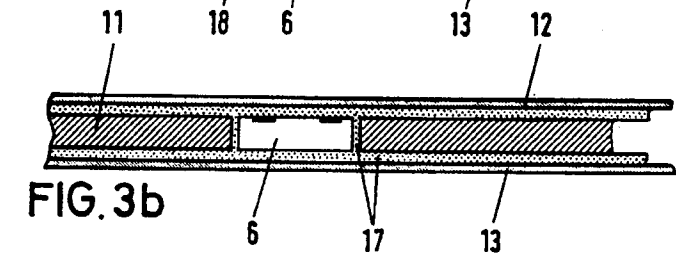
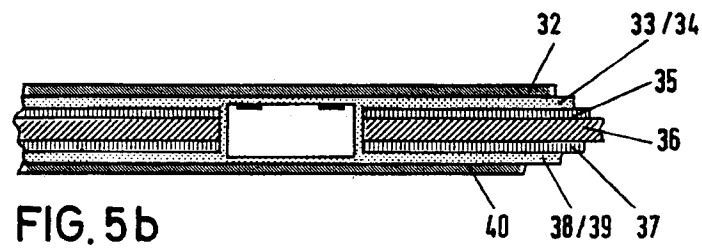
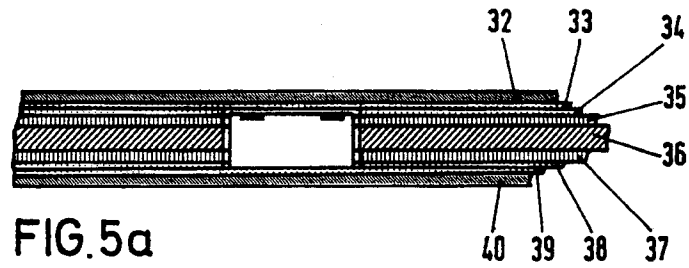
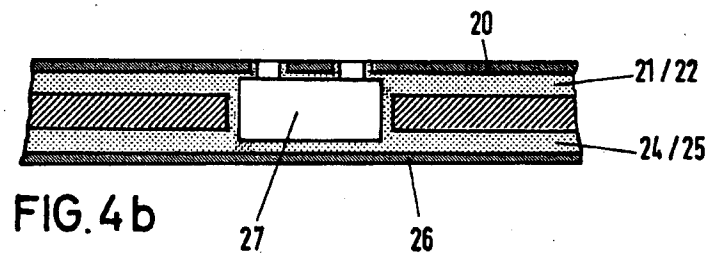
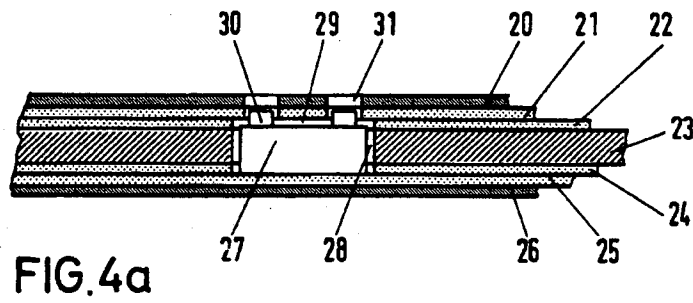


FIG. 3b

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IDENTIFICATION CARD WITH AN IC-MODULE AND METHOD FOR PRODUCING IT

The invention concerns an identification card or a similar data carrier with an IC module for the processing of electrical signals, whereby the IC module along with its connection leads is arranged on a separate carrier element which is small in comparison to the identification card. The invention further concerns a method of producing this type of identification card.

Identification cards with embedded IC modules have been known for some time. The DE-OS No. 26 59 573, for example, discloses an IC module in which all the connection leads are arranged on a separate carrier plate consisting of rigid material. The carrier plate is glued into an appropriately prepared recess in the card or is connected at the edges with the card by a high-frequency welding process. These methods entail only a slight degree of thermal and mechanical stress for the arrangement, but are elaborate in respect to the card production, since several procedural steps, some of which are technically complicated, must be carried out in the production of the identification card. The incorporation of the carrier element is intended in the case of this known identification card to take place in the so-called embossing area, so that these cards do not meet the usual norms which require the embossing area to be used only for embossings.

The object of the invention thus consists in providing an identification card with an IC module which avoids the above-mentioned disadvantages and can be produced with considerably fewer technical resources.

According to the invention this object is solved through a carrier element laminated into a card composite and connected with the identification card on all sides and over its entire surface. The method of production is characterized in that during the heating phase of the identification card layers the laminating pressure is kept lower than in the final laminating phase, at least in the area of the carrier element.

The invention uses the hot lamination technique, which has been known for some time and is established in practical operation, in order to apply the carrier element provided with the IC module and the connection leads to the card composite in one procedural step during the melting of the various card layers.

The processing of a separate carrier element produced independently of the identification card production in order to produce IC identification cards by using the so-called hot lamination technique proves to be particularly advantageous for this purpose.

The carrier element, which also bears all the connection leads in addition to the integrated circuit, is particularly suited to resist mechanical stress. This is especially true of the stress to which the identification card is exposed in daily use.

The employment of a laminating technique that has been tried out for some time in practical operation allows for the possibility of a rational production of the cards.

Furthermore, hot-laminated identification cards are characterized by an excellent appearance which is due to, among other things, the smooth and highly transparent cover layers of the card. Moreover, hot-laminated identification cards are very well ensured against forgery, as this technique requires a considerable degree of practical experience and the various layers of a hot-

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laminated identification card can be separated from each other only by destroying the card.

Identification cards with integrated circuits, for the production of which cards heat and/or heat and pressure are used, are already known (DE-OS No. 22 20 721, DE-OS No. 26 33 164). However, unlike the invention at hand, the identification cards of the publications are based on an entirely different construction of the IC card. The network bonded with the integrated circuit is arranged over a large surface of a middle card layer. In these arrangements the connection points between the network and the IC arrangement are greatly endangered during production of the card as well as during its handling.

The prior publications, which mention the identification card production only in passing, are not oriented towards practical application in respect to the identification card technology. The production techniques are taken over from the usual identification card production, without taking into consideration the specific problems arising in the incorporation of IC modules and their connection leads into identification cards.

However, the DE-OS No. 26 59 573 is the first to deal with the practical problems arising in the production and handling of IC identification cards. It refers to the fact that production by means of a hot lamination technique is not possible as the IC arrangement is too greatly endangered especially by the thermal stress. In order to avoid the difficulties that arise from this, another much more elaborate and technically impractical manner of card production is therefore adopted. Although the arguments raised in the DE-OS No. 26 59 573 against the hot lamination technique were substantiated by a number of experiments, it turned out that the production of IC identification cards by the so-called hot lamination technique is nonetheless possible if special measures are taken to protect the IC module and its connection leads. It also turned out that not only the thermal stress, but also the great mechanical stress during the laminating process can endanger the IC arrangement to the same degree, especially when local pressure peaks appear in the area of the arrangement. This type of stress can break the silicon wafer and/or destroy the junctions of the crystal and the connection leads, which are endangered by the effect of the heat anyway.

The basic idea of the invention consists essentially in applying the full laminating pressure to the carrier element only after one or more layers of the card composite have been softened. This can take place, for example, by providing buffer zones in the card composite before it is laminated, or in the laminating device, which buffer zones keep the full laminating pressure away from the carrier element during the initial phase. A further possibility is to control the laminating pressure as a function of the temperature and/or the degree of softness of the identification card layers. The appearance of local pressure peaks is not possible as the operations according to the invention all involve the full laminating pressure being applied over the entire surface of the material that is already softened or is elastically deformable in a cold state and surrounds the carrier element.

In the following, the embodiments of the invention are described in more detail with reference to the attached drawings. These show:

FIG. 1—the top view of an identification card with an embedded integrated circuit,

FIGS. 2a, b—the first embodiment of the card construction before and after lamination in cross-section,

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FIGS. 3a, b—the second embodiment of the card construction before and after lamination in cross-section,

FIGS. 4a, b—the third embodiment of the card construction before and after lamination in cross-section and

FIGS. 5a, b—the fourth embodiment of the card construction before and after lamination in cross-section.

FIG. 1 shows an identification card 1 with an embedded IC module 5. The IC module itself is placed in a carrier element 6 which has a disk-shaped construction in the embodiment shown. The contact surfaces 7 are provided for contacting.

The carrier element 6 is produced independently of the card production. The construction of the carrier element, the type of materials employed, the arrangement and construction of the contacts can vary greatly depending on the technical resources and the range of application of the elements in the finished identification card.

The identification card shown in FIG. 1 meets the ISO norm in its dimensions and in the arrangement of further functional areas. Accordingly, the magnetic strip 15 is on the reverse side of the card, as also shown in FIGS. 2a, b.

The fields 9 and 10, respectively, are provided for machine-readable and non-machine-readable embossed data.

FIG. 1 shows an advantageous arrangement of the carrier element 6 outside the embossing fields 9 and 10, respectively, in an area of the card subjected to little stress.

The embodiments described in the following show by way of example by what means local pressure peaks can be kept away from the carrier element, although the whole card composite, including the area in which the carrier element is arranged, receives the full laminating pressure at least in the final phase of the laminating process.

It is thus possible to produce identification cards with an integrated circuit with the quality of usual hot-laminated cards without endangering the circuit and its connection leads.

FIGS. 2a and 2b show the first embodiment of the invention before and after the laminating process. The proportions of the various elements of the card are not always shown in correct scale in this and the following embodiments, for the sake of clarity.

The simple card composite shown in cross-section consists of a—possibly many-layered and printed—card core or card bed 11 and the cover films 12 and 13. The card core and the cover films can consist of PVC (polyvinyl chloride). Paper can also be used as a card bed. The card bed is provided with a closely fitted recess to accept the carrier element 6. The thickness of the card bed is chosen relative to the thickness of the carrier element 6 in such a way that a cavity 14 results in the unlaminated card composite between the surface of the carrier element and the cover film 12.

The carrier element is only subjected to little stress in the initial phase of the laminating process due to the buffer zone formed by the cavity 14. In the further course of the laminating process the card composite is gradually heated up so that the PVC-layers soften. In the softening phase of the layers the cavity 14 disappears and the full laminating pressure now also takes effect in the area of the carrier element 6. In this phase

the softened layers form a cushion which keeps local pressure peaks away from the carrier element.

As shown in the laminated card composite (FIG. 2b), the carrier element 6 is connected with the identification card 1 on all sides and over its entire surface, i.e. it is laminated in. In the process a magnetic strip 15, if required, is embedded in the film material in such a way that a smooth surface also results in the area of the magnetic strip.

The contacts or coupling elements 7 are covered in the embodiment by the film 12. This embodiment is thus suitable for indirect (contactless) contacting (e.g. capacitive or optical). If the energy transfer is to take place optically, the cover film 12 should be constructed so as to be transparent in the area of the coupling elements 7 according to the type of light employed. When IR (infrared) light is employed, the cover film can be blackened in the area of the carrier elements, so that stray light is simultaneously kept away from the IC arrangement.

In principle direct contacting can also be carried out, if, for example, the cover layer 12 is pierced for contacting with appropriate contact elements.

FIGS. 3a and 3b show the second embodiment of the invention, in which one or more buffer zones are formed by intermediate layers in the card composite, for example by a so-called laminating adhesive. For this purpose the cover films 12 and 13 are coated with the laminating adhesive 17 before the laminating process (FIG. 3a).

Adhesive suitable for this purpose (e.g. polyurethane hotmelt adhesive) should be elastic at normal temperature and have a softening temperature below that of the cover layers chosen for the card composite.

In the above-mentioned embodiment the recess of the card core 11 is punched with a diameter larger than that of the carrier element 6. Thus a free gap 18 arises around the carrier element 6, in addition to the cavity 14 shown in FIG. 2a. The recess need not in this case be fitted to the carrier element within such narrow limits as in the arrangement shown in FIG. 2a.

The carrier element is hardly subjected to any stress in the initial phase of the laminating process in the card construction shown in FIG. 3a either. As soon as the laminating temperature reaches the softening temperature of the adhesive 17 and finally surpasses it, the laminating adhesive 17 flows into the cavities 14 and 18 and thus forms a homogeneous casing for the carrier element 6.

The carrier element thus protected from local pressure peaks can now accept the full laminating pressure over its area and transfer it to the surroundings. In the meantime the cover films have also reached the softening temperature so that finally an intimate composite of all layers with each other and with the carrier element which is closed in on all sides, results.

In the complete laminated identification card (FIG. 3b) the carrier element 6 is surrounded by the adhesive 17 which is elastic in a cold state and keeps the mechanical stress arising in the daily use of the card away from the carrier element to a considerable degree.

Polyurethane can be processed not only as a fusion adhesive, but also in the form of a fusion adhesive film in the card composite. If a very soft polyurethane fusion adhesive film (e.g. platilon U02-TM Plate Bonn GmbH) is used in the card composite, it is possible to choose the thickness of the various card layers relatively to the thickness of the carrier element within such limits so as

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to make the cavity 14 very small or completely disappear, if need be. A very soft fusion adhesive film is able to accept local pressure peaks to a certain degree, even when the card composite is in a cold state. When the film softens the laminating process then proceeds as described above.

FIGS. 4a and 4b show the third embodiment of a card construction according to the invention, in which the buffer zones are formed by using, among other things, compound films.

The arrangement shown in FIG. 4a shows the construction of the card layers before lamination.

The many-layered card core consists of a paper layer 23 and the films 22 and 24 arranged on both sides of this layer. These films consist of the thermoplastic material polyethylene (PE). PE can be varied within broad ranges as far as its mechanical and thermal qualities are concerned depending on its density. PE with low density is, unlike PVC, relatively soft while having great plastic deformability and a low softening point.

In the extended card core a recess is punched depending on the diameter of the carrier element 27, which recess leaves a gap free all around the carrier element. The thickness of the various layers of the card core is chosen relative to the thickness of the carrier element 27 in such a way that a cavity 29 also remains between the carrier element and the cover layers 21 and 22 next to it. The cover layers 20, 21 and 25, 26 consist of polyethylene-coated polyvinyl chloride films which are processed as compound films. The upper cover layer 20, 21 is provided with appropriate recesses 31 to conduct the contacts 30 of the carrier element 27.

In a cold state the carrier element 27 is hardly affected by the pressure of the laminating plate due to the selected layer construction. In the course of the laminating process the PE layers are first subjected to the flow phase so that the cavities 28, 29 are filled up with the PE material. The casing protects the carrier element from local pressure peaks during the high pressure necessary in the final phase of lamination and also provides good protection against mechanical deformation in the daily use of the card.

In the embodiment of an IC identification card shown in FIG. 4b, the contacts of the carrier element 27 are directed to the surface of the cover layer, so that in this case direct contacting is possible.

FIGS. 5a and 5b show a fourth embodiment of the invention, in which only so-called compound films are used to form the buffer zones.

The compound films used in this example as cover layers are polyester films (PETP) 32 and 40, respectively, which are coated with polyethylene (PE) 33 and 39, respectively. The symmetrically adjacent second compound films consist of PE 34, 38 and PVC 35, 37. The card core itself 36 can consist optionally of PVC or paper due to this special card construction.

FIG. 5b shows the identification card after the laminating process, which can proceed as explained in connection with FIGS. 4a, 4b. As mentioned, the cover films of this identification card consist of a special polyester.

PETP (polyethylene glycol terephthalate) is a thermoplastic polyester with very great rigidity, great abrasive resistance, little tendency to contract and a high softening point. These films are thus especially well suited for identification cards that are exposed to great stress in daily use.

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As the polyester films employed have only little tendency to contract, unlike, for example, PVC films, it is possible to heat the card composite at first without using pressure, until the PE layers go into the flow phase. The card compound softened in this way is then pressed together under pressure. The card layers that have been softened in a heating unit can thus subsequently be pressed together e.g. with the help of two rollers, by the so-called roller lamination technique.

In the above embodiments buffer zones are provided in the layer construction of the card composite to protect the carrier element.

It is, however, also possible to provide the carrier element itself with a buffer zone over its entire surface or only partially—before lamination. Usable materials, their properties and their behavior during the laminating process have been mentioned in connection with the description of FIGS. 3a and 3b. The carrier element could be dipped in an appropriate resin for a casing of its entire surface.

If the carrier element itself consists of rigid material, a partial coating of the element can, for example, be provided by covering the contact side with a fusion adhesive film as a buffer zone.

A further possibility of protecting the carrier element from local pressure peaks during lamination consists in coating the laminating plates with a soft, flexible material at least in the area of the carrier element. Silicon rubber is, for example, appropriate for this purpose.

Finally it is also possible to protect the carrier element against local mechanical stress during incorporation into identification cards, if the laminating pressure is adjusted as a function of the temperature. In this case the contracting tendency of the film type employed must be taken into consideration, as it rises with the temperature.

The laminating pressure will thus be increased as a function of the temperature in such a way that the films involved do not warp, but on the other hand the carrier element is subjected to the full laminating pressure in the final phase of the laminating process, after the card layers have softened. By use of the method of controlling the laminating pressure as a function of the temperature, integrated circuits can be embedded in identification cards undangerously, without any need of additional measures.

On the other hand, it may prove useful for certain cases of application, e.g. the processing of films with a great contracting tendency, to combine the method of controlling the laminating pressure with one or more of the above-mentioned protective measures.

What is claimed is:

1. A method for producing a multi-layer identification card having an IC-module for processing electrical signals, the IC-module with its connection leads being arranged on a separate carrier element that is small relative to the identification card, said method avoiding localized pressures on the carrier element during production of the card and comprising the steps of:

providing an identification card assembly including an internal layer having a recess for the carrier element and at least one covering layer heat sealable to the internal layer, at least one of said layers being thermally softenable;

inserting the carrier element in the recess;

before or after inserting the carrier element in the recess, establishing a buffer proximate to the carrier element for limiting the application of force to

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the carrier element prior to thermal softening of the card layer; and
 applying heat and pressure to the identification card assembly to heat seal the layers together, said buffer limiting the application of force to the carrier element prior to softening of the thermally softenable layer to avoid localized pressure on the carrier element.

2. The method as in claim 1 wherein the step of establishing the buffer is further defined as forming the recess in the internal layer of the identification card assembly to provide spacing between at least one of the layers and the carrier element prior to the softening of the thermally softenable layer.

3. A method as in claim 2 wherein the step of establishing the buffer is further defined as providing an additional card layer intermediate the internal layer and covering layer having a lower thermal softening point than that of the covering layer or internal layer.

4. A method as in claim 2 wherein the step of establishing the buffer is further defined as at least partially encasing the carrier element in a material having a thermal softening point lower than that of the covering layer.

5. A method as in claim 1 wherein the step of establishing the buffer is further defined as providing an

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elastic means intermediate the carrier element and at least one of the layers to which pressure is applied.

6. A method as in claim 5 wherein the step of establishing the buffer is further defined as at least partially encasing the carrier element in an elastic material.

7. A method as in claim 5 wherein the step of establishing the buffer is further defined as forming the buffer by incorporating an elastic layer in the identification card assembly.

8. A method as in claim 5 further defined as providing an elastic means intermediate the carrier element and layer that has a higher degree of elasticity in the unheated state than the layers of the card assembly.

9. A method as in claim 1 further defined as controlling the pressure applied to the assembly as a function of the temperature of the assembly.

10. A method as in claim 1 further defined as controlling the pressure applied to the assembly as a function of the amount of softening of the thermally softenable layer.

11. A method as in claim 2 further defined as applying the heat to the identification card assembly and thereafter applying pressure to the assembly.

12. A method as in claim 7 wherein the step of establishing the buffer is further defined as forming the buffer as an elastic coating on one of the layers of the card.

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United States Patent [19]

Vieilledent

[11] Patent Number: 4,701,236

[45] Date of Patent: Oct. 20, 1987

[54] METHOD OF MANUFACTURING AN ELECTRONIC IDENTIFICATION CARD

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[73] Assignee: U.S. Philips Corporation, New York, N.Y.

[21] Appl. No.: 847,987

[22] Filed: Apr. 3, 1986

[30] Foreign Application Priority Data

Apr. 12, 1985 [FR] France 8505518

[51] Int. CL⁴ B32B 31/04; B32B 31/08; B32B 31/10; B32B 31/12

[52] U.S. Cl. 156/252; 156/253; 156/261; 156/289; 156/297; 283/904; 427/195; 427/282; 427/384

[58] Field of Search 156/252, 253, 261, 289, 156/297; 427/179, 195, 282, 384; 283/904

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Primary Examiner—Donald E. Czaja

Assistant Examiner—Lori Ann Cuervo

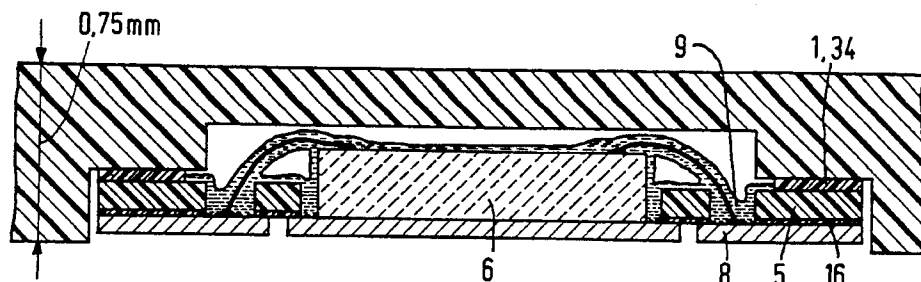
Attorney, Agent, or Firm—Robert T. Mayer

[57] ABSTRACT

The method and arrangement according to the invention utilize an adhesive tape (1) covered with a protective layer (2) provided with openings (4).

This tape is glued on a film (5) carrying contact metallizations (8) and integrated circuit chips (6) electrically connected to the said metallizations. The tape is glued on the film in such a manner that its openings (4) correspond to the positions of the integrated circuit chips (6). Subsequently, a coating varnish is applied by pulverization to the film and then the protective layer is removed with the varnish covering it. Vignettes slightly larger than the said openings are then cut in the film in such a manner that an adhesive ring is left around the integrated circuit chips. Each vignette is finally arranged in a recess ad hoc (12) of a card (10).

8 Claims, 10 Drawing Figures



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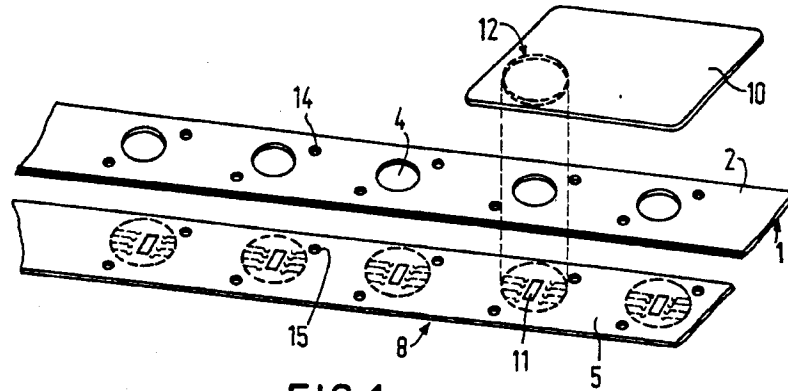


FIG. 1

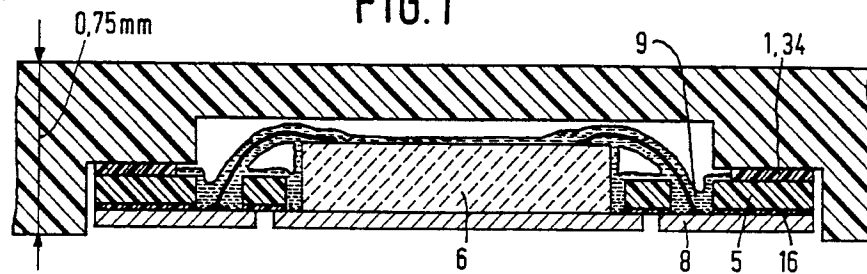


FIG. 3

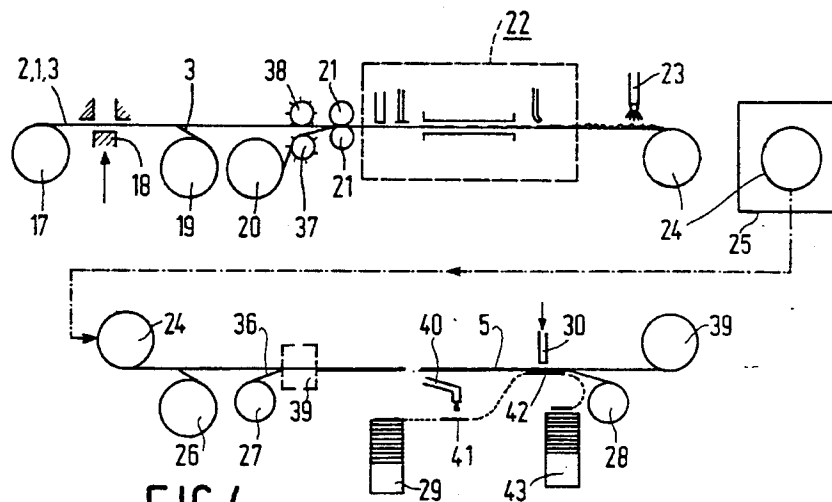
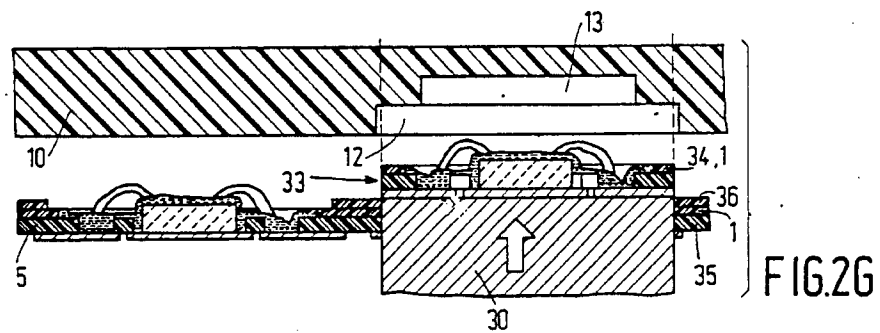
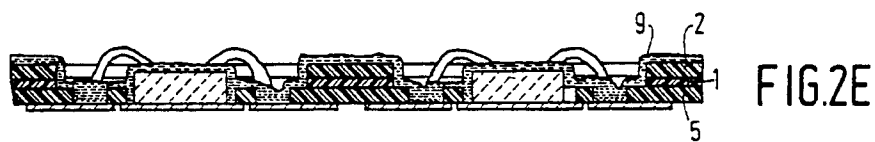
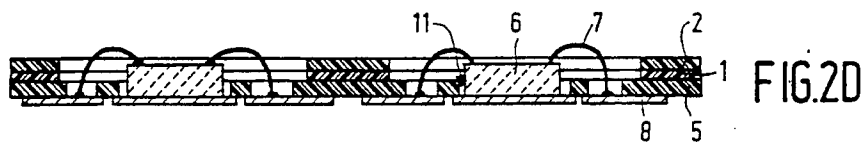
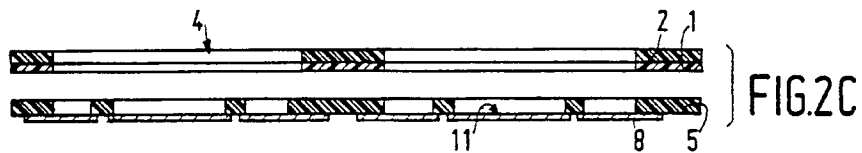
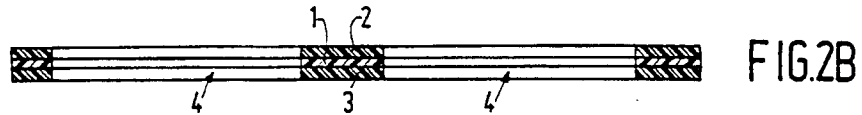


FIG. 4

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METHOD OF MANUFACTURING AN ELECTRONIC IDENTIFICATION CARD

The invention relates to a method of manufacturing an electronic identification card, in which at least one integrated circuit chip is mounted on a film carrying conductor tracks, which is cut to form a vignette or section supporting the integrated circuit chip, this vignette or section then being arranged in a recess which is provided in a card and whose dimension corresponds to that of the vignette.

It also relates to an arrangement for manufacturing an identification card provided with a film supply spool, with an assembly for continuous mounting and electrically conducting semiconductor chips on the said film, with a machine for cutting vignettes in this film and with means for mounting these vignettes in identification cards.

The identification cards manufactured by the method and with the aid of the arrangement according to the invention are utilized in a variety of fields, in which the use of a secret code and/or of a memory is required, such as payment cards or bank credit cards, medical identification cards, identity cards, cards for admission to reserved rooms, cards for the use of public telephones.

The manufacturing method and the arrangement mentioned above are known from, for example, French Pat. No. 2,439,438. According to this document, a film is used, on which are arranged integrated circuit chips, in which then vignettes, for example of circular form, are cut, which are arranged in a hollow recess provided for this purpose in the card.

According to this technique, the coating of the chip for protecting it against chemical attacks gives rise to problems. Either it is not coated, as in FIG. 3 of the aforementioned document, or a specific frame is provided for limiting the spread of the coating material, as in the case of FIG. 8 of the same document, which requires supplementary manufacturing steps.

The invention has for its object to provide a method and an arrangement which permit of obtaining a coating of the chip in a very simple manner and without special precautions being taken.

For this purpose, the method according to the invention is particularly characterized in that an adhesive tape is glued on the film, this tape being covered with a protective layer and being provided with at least one hole passing through the tape and the protective layer and through which the integrated circuit chip is accessible, but which is smaller than the aforementioned recess provided in the card, in that, after the integrated circuit chip has been mounted and before it is arranged in the recess of the card, a protecting varnish is provided on the side of the chip over the whole accessible surface of the integrated circuit chip, of the film and of the tape in order to protect the chip, and in that then the protective layer is detached whilst removing with it the varnish covering it and exposing the adhesive tape.

The invention is consequently based on the idea of combining two effects by the use of the protective layer, the latter serving as a reservoir for the protecting varnish and also being used in a conventional manner as an anti-adhesive protecting the adhesive tape.

The method according to the invention may be used for manufacturing vignettes one by one, but it is advantageously utilized in mass-production, in which the

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carrier film and the adhesive tape with its protective layer are each formed from a tape of substantial length supplied from a spool. In this case, the adhesive tape is advantageously glued on the film before the integrated circuit chip is mounted, the cutting of the film for forming a vignette advantageously takes place after the protective layer has been detached, the cutting operation is effected by a punch and the same punch is used for arranging the vignette in the recess of the card, in which it is then fixed by means of the adhesive tape. In order to avoid that, at the instant at which the vignette is cut, the film and the tape, which are no longer provided with a protective layer, are disadvantageously glued on the anvil associated with the punching tool it is advantageous that, before the vignette is cut, the adhesive tape is provided with an auxiliary protective layer provided with holes having a dimension and a shape practically identical to those of the recess of the card whose position is chosen so that one of these holes corresponds to the recess in the card at the instant at which the cutting step is effected and the vignette is fixed.

For carrying out the method according to the invention, an arrangement provided with the aforementioned elements is moreover advantageously provided upstream of the assembly for mounting chips with a spool of adhesive tape covered with two protective layers, with a tool for providing holes in this tape, with a first means for detaching and receiving one of the protective layers, with pressing means for gluing the tape on the film, with calibration means for the relative positioning of the film and of the tape and downstream of the assembly for mounting chips with an apparatus for depositing varnish, with a second means for detaching and receiving the second protective layer, with a punching tool for cutting vignettes in the film and with a system for supplying cards associated with this punching tool cutting in a single operation a vignette in the film and arranging it in a card.

In order that the invention may be readily carried out, it will now be described more fully, by way of example, with reference to the accompanying drawing, in which:

FIG. 1 is a perspective view of a film, a tape and a card used in accordance with the invention;

FIG. 2 shows in a sectional view along the longitudinal axis of the film the constituents used in the method according to the invention in different stages of the manufacture;

FIG. 3 is a sectional view at the level of the vignette of a finished card obtained by the method;

FIG. 4 shows an arrangement according to the invention for manufacturing cards.

FIG. 1 shows a film 5, such as used in the prior art. This film is provided with printed conductors 8 (visible through the film) and sites 11 are formed therein for mounting an integrated circuit chip 6. This film is not necessarily provided with holes of the "cinematic film" type, but it has to comprise at least one calibration hole 15 for the mounting site of an integrated circuit.

Above the film 5, an adhesive tape 1 is shown provided with a protective layer of, for example, siliconated paper, which covers the gluing surface of the tape, but without adhering firmly to it. In the Figure, the layer 2 is located above the tape 1. This assembly of layer and tape has been provided beforehand with holes 4, the dimension of which will be explained hereinafter and with position calibration holes 14, which correspond to the holes 15 of the film, while the tape 1 is

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arranged opposite to the film 5 so that to each site 11 for mounting an integrated circuit 6 corresponds a hole 4. The state of the method shown in FIG. 1 corresponds to FIG. 2C, which will be explained below.

Although it does not yet exert any influence in this stage of the method, a card 10 provided with a recess 12, viewed in transparency, is shown in order to indicate the relative dimensions and positions of the different elements, which will be described hereinafter.

FIG. 2A shows in sectional view an adhesive tape 1 used for carrying out the invention and provided with two protective layers 2, 3. Such a tape is marketed, for example, under the designation "Y 9460" by the 3M Company.

In FIG. 2B, a hole 4 passing through the tape and the protective layers is formed in the tape.

In FIG. 2C, the lower protective layer 3 has been removed and the tape has been taken to below a film 5 carrying conductors 8. The tape with the protective layers and the film are both advantageously supplied from a spool 17 (FIG. 4).

In FIG. 2D, the tape has first been glued to the film and then an integrated circuit chip 6 is mounted in a cavity 11 of the film and subsequently connected to the conductors 8 of this film by means of wires 7. Various methods of mounting and electrically connecting integrated circuits are known to those skilled in the art and are described in numerous publications, among which are the French Pat. No. 2,439,438 stated above, and, for example, the French Pat. No. 2,548,857, European Patent EP 0 116 148 and French Pat. No. 2,520,541.

FIG. 2D moreover shows that the chip is accessible through the hole of the tape 1, 2.

FIG. 2E shows the film and the tape covered with a varnish 9 over the whole surface of the tape and the surface of the film accessible through the hole of the tape. Of course the integrated circuit chip and its connecting wires are also covered with varnish so as to be protected from chemical attacks that could damage them in future.

The varnish used is advantageously a polymerizable varnish on the basis of silicone and has a viscosity adapted to its deposition by pulverization. For example, the varnish marketed under the designation "Electrofluage 200" by the Siceront KF Company may be used. It is advantageous to avoid the use of varnishes polymerizable by ultraviolet radiation, because the latter could have undesirable effects on certain types of integrated circuits.

FIG. 2F shows the film and the tape after the protective layer 2 has been removed, which has the effect that the varnish that would cover it is also removed and that the adhesive tape is exposed. Thus, the varnish covering the chip and the film is accurately limited according to a perimeter which is exactly that of the hole in the tape 1.

FIG. 2G shows a part of a card 10 that is arranged opposite to the film 5. A punching tool 30 is represented to show how, after the protective layer has been removed, this tool cuts a vignette or section 33 from the film which is received at the end of its course by the recess 12, 13 of the card 10.

The dimension of the vignette or section 33 cut by the punching tool 30 corresponds to that of the recess in the card, that is to say that it is cut as a function of the various manufacturing tolerances in such a manner that it fits as exactly as possible in the recess. The recess in the card has an external part 12 and a deeper central

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part 13, whose effect will be explained in greater detail with reference to FIG. 3.

This Figure moreover shows that the hole of the adhesive tape is smaller than the recess 12 provided in the card so that, after the vignette 33 has been cut by the punching tool 30, an adhesive ring 34 is left on the vignette, 33 this adhesive ring ensuring that the vignette is fixed in the card. This effect of the choice of the diameters in the case of, for example, circular holes is also indicated by vertical broken lines in FIG. 1.

FIG. 2G shows only the punching tool 30 just mentioned. It may be necessary to interpose between the film and the card an anvil corresponding to the tool 30 in order to hole in place the non-utilized film part 35. The suitable measures not shown can be easily taken by those skilled in the art. Moreover, the card itself may serve as an anvil, the part 35 of the film then being directly applied to the card; it is then necessary that the vignettes are spaced apart by a larger distance than in the Figure in order that one vignette at a time is opposite to the card.

In order to avoid that the non-utilized parts of the film adhere in an undesirable manner to the anvil or to the card, there is arranged between the stages shown in FIGS. 2F and 2G an auxiliary protective layer 36 of the same kind as the layers 2 and 3, which is provided with holes having a dimension and a shape practically identical to those of the recess 12 in the card 10 and whose position is chosen so that one of these holes corresponds to the recess in the card at the instant at which the vignette is cut and fixed in such a manner that not a single part of the layer 36 is cut and introduced into the recess 12.

FIG. 3, which shows a sectional view of a finished card, permits of illustrating the relative thicknesses of the constituents. The scale of the thicknesses is about five times larger than the horizontal scale. The vertical arrow in the lefthand part of the Figure indicates a thickness of about 0.75 mm.

The different elements already described are designated therein by the same reference symbols: the film 5 and its metallizations 8, which are glued under the film by a glue layer 16, the chip 6 which, although it is mounted in a cavity of the film projects beyond the surface of the latter because the film has a thickness of about 150 μm (inclusive of the glue 16, but exclusive of the metallizations 8, whose thickness is about 70 μm), while the chip 6 has a thickness of about 300 μm . The adhesive 34 has a thickness of 50 μm and the recess in the card 10 has on the outer side a depth of 300 μm at the area at which the aforementioned adhesive ring 34 (FIG. 2) adheres and at the centre a depth of about 500 μm in order that the recess for the chip 6 is obtained. The varnish 9 must have a thickness of about 10 to 50 μm , that is to say that it must have a smaller thickness than the adhesive 34.

FIG. 4 shows an arrangement for carrying out the method described above. This arrangement comprises a spool 17 for supplying adhesive tape protected at its two surfaces by a protective layer, for example of siliconated paper. This tape with its protective layers is unwound in a punching tool 18, which forms therein at regular distances the holes described above. Subsequently, a spool 19 set into rotation exerts a pulling force on the first protective layer 3 in order to detach and receive it. Instead of being wound onto a spool, this layer could otherwise also fall directly into a bin. For example, an assembly of a roller and a capstan could

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then be provided for exerting a pulling force on the layer before it is released. A spool 20 supplies the film provided with metallizations and with sites for mounting therein an integrated circuit chip 6 (FIGS. 1 and 3). This film follows at the end of the spool a path identical to that of the adhesive tape and they are glued on each other by a couple of pressure rollers 21. Before the films are applied one to the other, they are each guided by a wheel 37, 38 provided with bolts which are represented symbolically and are engaged in the perforations 15 of the film and 14 of the adhesive tape, respectively (see FIG. 1). These two wheels are rotatably coupled to each other in order to ensure that the perforations of the film and the tape correspond to each other (relative positioning).

At the end of the pressure rollers 21, the film covered by the adhesive tape with its protection layer is passed into an assembly 22 for mounting and electrically connecting integrated circuit ship. This apparatus is well known and does not form part of the invention; therefore, the Figure shows only very diagrammatically and without individual reference numerals from the left to the right a tool for deposition of glue, a pipette for mounting chips, a passage furnace for drying the glue and a wire connecting tool thereof. As shown by the assembly of the arrangement, the chips are mounted on the upper side of the film, as is usual.

At the end of the mounting assembly 22, the film passes in front of a varnish pulverization nozzle 23. This nozzle is adjusted so that a thickness of about 30 μm of varnish is obtained. Alternatively, a ring could be formed in downward direction in the film in order to cure it during its introduction into a bath of varnish. However, this method is less interesting because it requires that a protection of the back of the film should be provided beforehand, which makes the method more complicated.

After deposition of the varnish, the film is wound onto a spool 24 whilst interposing an intermediate spacer layer between the turns, whereupon the whole spool is arranged in a drying oven 25 for drying and/or polymerizing the varnish.

The spool is then taken out of the oven, as the case may be after having been stored, and another part of the apparatus which may be situated at quite a different place than the first part because the varnish spools can be transported without the risk of deterioration, is provided with a support for the said spool 24 and with a spool 26 for detaching and receiving the second protective layer. This spool operates in the same manner as the spool 19 described above and can be replaced like the latter by other equivalent systems. A system for supplying cards is provided, for example, with a card-loading magazine 29. A known system for handling cards (not shown) takes the cards from the loader 29 along the path indicated by dotted lines and presents a card opposite to a vignette in the position 42 (the relative position of card and vignette corresponds to that of FIG. 2G, but turned upside down). Finally, a punching tool 30 cuts the vignette into the film and at the end of the course places this vignette in the recess of the card, in which it is glued due to the adhesive ring (34.1, FIGS. 2G and 3).

There is disposed between the loader 29 and the position 42 an automatic metering tube 40, which serves to deposit in the recess 13 of the card which is of course present in the upper surface of the latter, a given quantity of, for example, 30 mg of a coating material, for

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example the products known under the commercial designations STYCAST 2850 FT and CATALYST 24 LV of the trademark Emerson-Cuming, mixed in the respective ratios 100/7. Finally, the handling system returns the card after the provision of the vignette and places it in a loader of finished products 43.

Whilst returning the card, the coating material, which was present in the lower part of the recess, flows over the integrated circuit chip, but is held in the recess because the latter is obturated by the vignette. Although the aforementioned product can polymerize in the environment, it is preferable to heat the finished cards at 60° C. for two hours in order to improve the mechanical properties of the coating material. Due to this product, the resistance to repeated bending of the cards is considerably improved because the varnish deposited beforehand is itself of a kind which remains flexible and does not have a mechanical effect during the bending of the cards.

The arrangement is moreover provided upstream of the apparatus for arranging the vignette with a spool 27 for supplying the aforementioned auxiliary protective layer 36 perforated beforehand and with calibration and pressure means 39 for positioning this layer and the film with respect to each other in the manner described above and applying the layer to the tape, these means being similar to the means 37, 38, 21. Downstream of the apparatus 29, 30 there is provided a spool 39 or an arbitrary device for receiving the remainder of the film and the tape provided with its protective layer 36. Now that the vignettes have been detached and mounted, it is not effective to detach the protective film 36, while the assembly of the remaining parts of the film, the tape and the layer is placed in the bin. However, if the protective layer 36 supplies from the spool 27 should be re-used, which is quite possible because it is not subjected to a single operation modifying it, a means 28 identical to the preceding means 19 or 26 will be provided.

Different variations or equivalents are possible without departing from the scope of the invention. For example, the integrated circuit plates could be arranged before the adhesive tape is positioned and glued. However, the thickness of the plate, which projects beyond the surface of the film, would prevent smooth rollers from being used at 21. Rollers would then be required provided with cavities at the area of the plates, these rollers in turn being connected to the wheels with bolts 37, 38 in order to ensure that the cavities corresponds to the film. Likewise, the assembly of the equipment may comprise several parallel films and the loader 29 may contain plates of large diameter comprising a plurality of elementary cards on which several films at a time together deposit one vignette per card. The card loader 29 may be replaced by a spool, onto which a support is wound, to which cards are fixed at regular distances.

What is claimed is:

1. A method of manufacturing an electronic identification card with at least one integrated circuit chip wherein the chip is mounted in a cavity in a carrier film having conductor tracks, said carrier film being cut to form a section which supports said chip, said section to be disposed in a recess provided in the card, the dimension of said recess corresponding to that of said section, said method including sticking a first side of an adhesive tape with adhesive on both sides to said section of said carrier film, said tape having a removable protective layer stuck to its second side, having formed therein an aperture in said tape and its protective layer which

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aperture is larger than said cavity but smaller than said recess, said aperture being disposed over said cavity to render said chip accessible through said aperture, applying varnish to said tape and said chip and removing said protective layer and the varnish covering it to expose the adhesive on the second side of said adhesive tape whereby said section can be pressed into and held in said recess by said second side of said adhesive tape.

2. A method according to claim 1, wherein the operation of cutting said carrier film to form said section is performed after the protective layer is removed and the operation is performed with a punch, said punch pushing the section into said recess.

3. A method according to claim 2, wherein the aperture in said tape and its protective layer is formed before said tape is stuck on said section.

4. A method according to claim 3, wherein the carrier film and the adhesive tape with its protective layer are each respectively supplied from a corresponding supply

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of such material of substantial length arranged on a spool.

5. A method as claimed in claim 4, wherein an auxiliary protective layer is applied to said adhesive tape before said section is cut from said carrier film, said auxiliary protective layer having an auxiliary aperture therein with a dimension and shape corresponding to said recess, said auxiliary aperture being disposed over said section so that said section is free of any auxiliary protective layer when it is cut from said carrier film.

6. A method as claimed in claim 5, wherein said adhesive tape is stuck on said carrier film before the integrated circuit chip is mounted on it.

7. A method as claimed in claim 6, wherein the varnish is a polymerizable varnish deposited by pulverization.

8. A method as claimed in claim 7, wherein the varnish is polymerized by winding the carrier film on a spool and placing the spool in a drying oven.

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United States Patent [19]**Haghiri-Tehrani et al.**[11] **Patent Number:** **4,792,843**[45] **Date of Patent:** **Dec. 20, 1988**[54] **DATA CARRIER HAVING AN INTEGRATED CIRCUIT AND METHOD FOR PRODUCING SAME**[76] **Inventors:** **Yahya Haghiri-Tehrani**, Winzerer Str. 98, 8000 München 40; **Joachim Hoppe**, Breisacher Str. 1, 8000 München 80, both of Fed. Rep. of Germany[21] **Appl. No.:** **106,890**[22] **Filed:** **Oct. 13, 1987****Related U.S. Application Data**

[63] Continuation of Ser. No. 752,072, filed as PCT EP84/00315, Oct. 9, 1984, published as WO85/02046, May 9, 1985, abandoned.

[30] **Foreign Application Priority Data**

Oct. 24, 1984 [DE] Fed. Rep. of Germany 3338597

[51] **Int. Cl.⁴** **G06K 19/06; H01L 23/30; G11C 11/34**[52] **U.S. Cl.** **357/72; 235/492; 235/488; 283/904**[58] **Field of Search** **357/72; 235/492, 488; 283/904**[56] **References Cited****U.S. PATENT DOCUMENTS**

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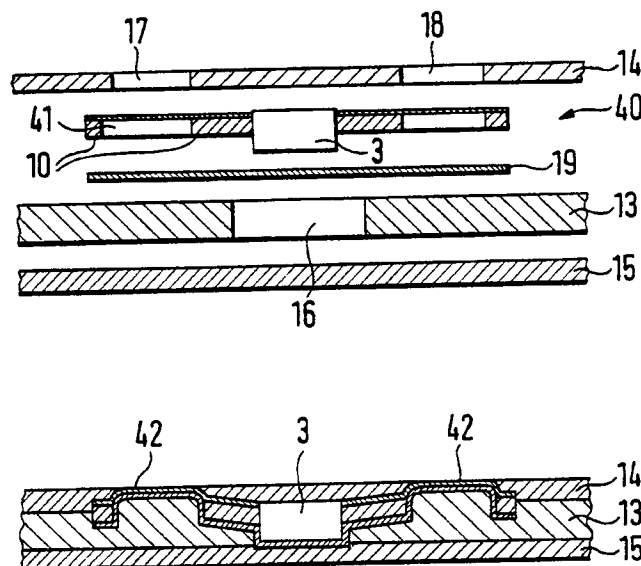
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Primary Examiner—Andrew J. James*Assistant Examiner*—John Lamont*Attorney, Agent, or Firm*—Bacon & Thomas[57] **ABSTRACT**

A multilayer data carrier into which a carrier element supporting an IC module is incorporated comprises a flexible substrate on which contact surfaces are formed which are connected to the IC module via leads. The carrier element is deformed in such a way, when being incorporated into the data carrier, that the IC module, in the finished data carrier, is located in the center of the card protected by cover layers of the card and the contact surfaces are flush with the surface of the card. A method for producing the data carrier comprises laminating a substrate layer carrying an IC-module with its leads and contact pad surfaces on one surface thereof between outer protective layers and with a central core layer such that the IC-module is disposed centrally within the data carrier with the contact surfaces disposed in apertures in one of the outer protective layers flush with the surface of said one layer.

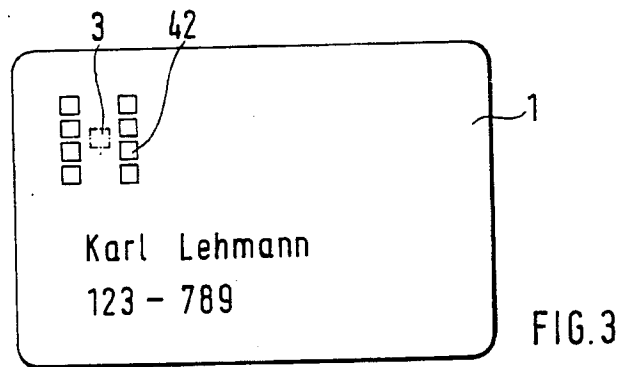
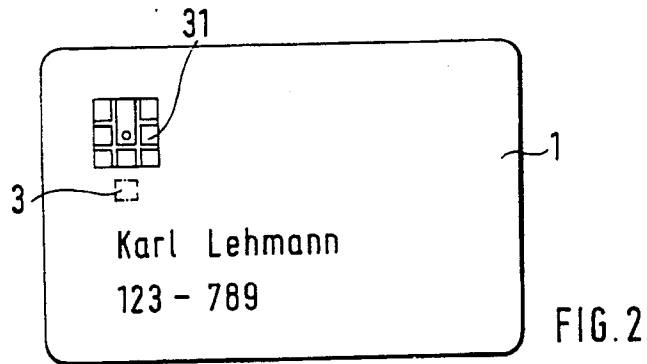
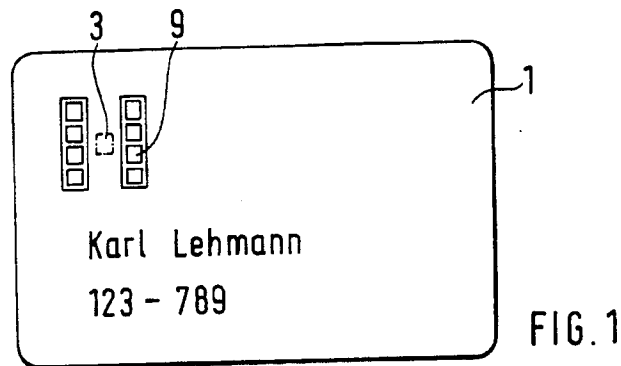
4 Claims, 4 Drawing Sheets

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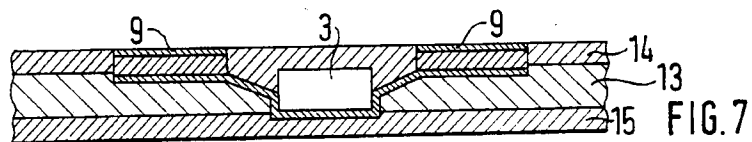
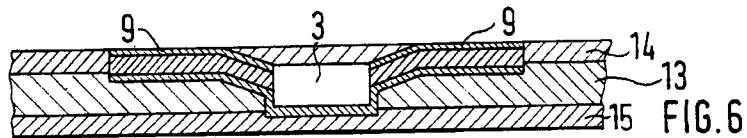
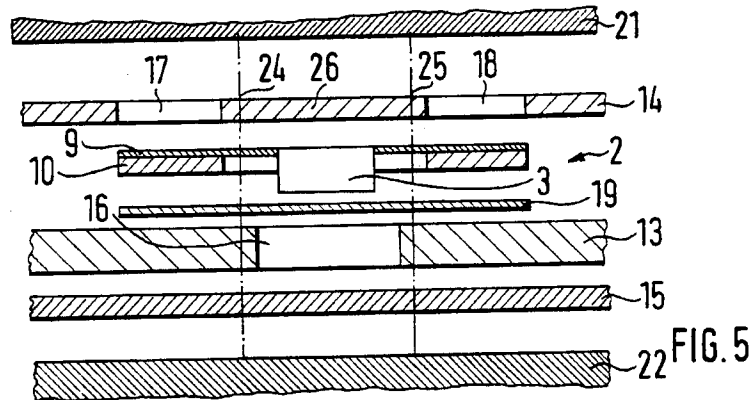
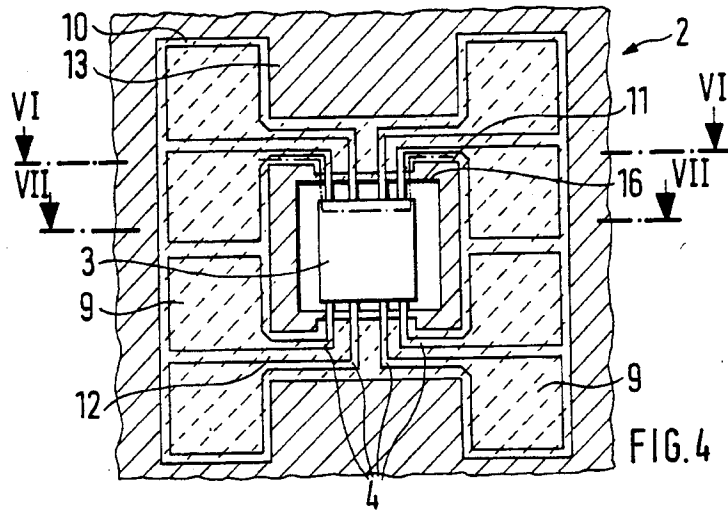


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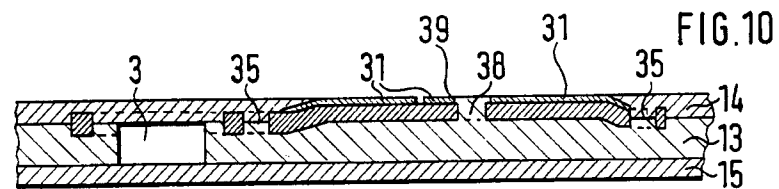
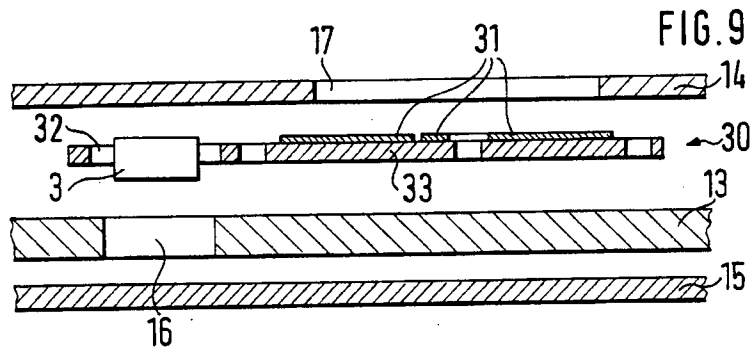
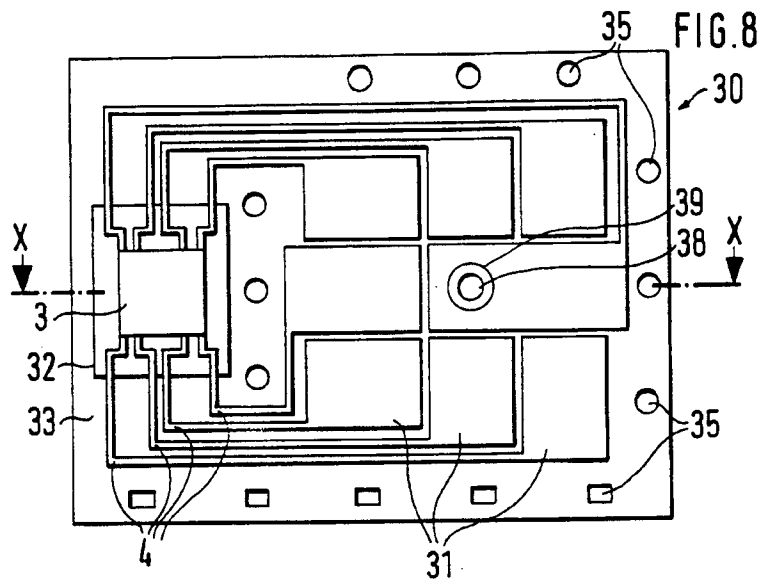


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